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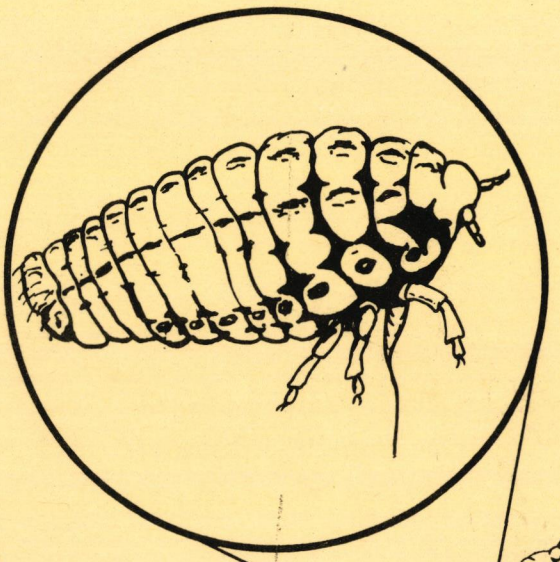
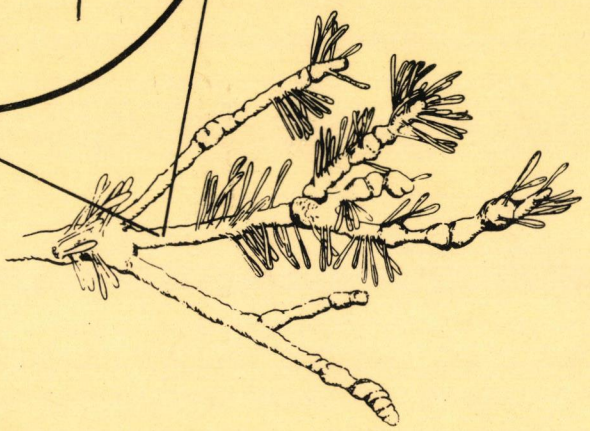
IDAHO FOREST PEST CONDITIONS & PROGRAM SUMMARY 1983





USDA Forest Service
NORTHERN and INTERMOUNTAIN
REGIONS

IDAHO DEPARTMENT OF LANDS

Report No. 84-1

IDAHO FOREST PEST CONDITIONS AND PROGRAM SUMMARY
1983

by

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INTRODUCTION

This report summarizes the results of aerial and ground surveys and associated activities conducted by pest management personnel within the Idaho Department of Lands and the Northern and Intermountain Regions, USDA Forest Service. These activities are designed to detect, monitor and make management recommendations for forest insect and disease outbreaks in Idaho. Major insect and disease damage on forested lands of all ownerships within the State is described. Tables indicating amount of damage and maps showing locations of major infestations are included.

Because of the difficulty in making accurate tree mortality counts while flying aerial surveys, numbers recorded in the tables should be regarded as estimates only. Comparisons of aerial survey and associated ground-truth data have shown that aerial estimates are usually low. Location and trend of damage from year to year can be determined by comparing maps and mortality estimates from previous reports.

CONDITIONS IN BRIEF

Statewide, mountain pine beetle mortality declined in 1983. There were, however, three areas in northern Idaho which experienced significant increases in local infestations. The Douglas-fir beetle remained at fairly low levels despite a few localized spots of concentrated activity on the Nezperce and Boise National Forests (NF's). Spruce beetle infestations have declined to near endemic conditions in those areas where it was observed. Small infestations continue in the extreme northern part of the State. Populations of pine engraver increased markedly in the northern portion of the State, while mortality attributable to the beetle declined south of the Salmon River. Fir engraver infestations, increased when compared to 1982, but remained at endemic levels Statewide. Mortality caused by other bark beetle species remained widely scattered and at very low levels.

Defoliation caused by the western spruce budworm increased in both extent and intensity wherever it was observed Statewide. In northern Idaho, budworm-infested acres on the Bitterroot NF increased nearly sixfold in 1983 with almost 24,000 acres affected. In the southern portion of the State, approximately 2.4 million acres contained defoliated host type. The Douglas-fir tussock moth infestation recorded in the Owyhee Mountains in southern Idaho has collapsed, despite an increase in defoliated acres in 1983. In the north, no visible defoliation was detected in forested areas, though some ornamental defoliation was reported. Pheromone-baited trap catches indicate still building populations on the Boise, Payette, Salmon, and Sawtooth NF's and in the Moscow/Plummer area, but static-to-declining trends elsewhere. Ponderosa pine stands defoliated by the pine butterfly were observed on the Boise, Payette, and Salmon NF's. Those infestations continued to increase in 1983.

The balsam woolly adelgid, a serious pest of true firs in the Pacific Northwest, was first recorded in Idaho in 1983. At this time, damage appears to be confined to a few subalpine fir in Coeur d'Alene and several subalpine fir stands east of Moscow. Some populations have been observed in young grand fir stands. We will continue to monitor the spread of this pest and assess its impact in 1984.

Root diseases continued to be the major disease problem on many Forests throughout the State. Some forest managers are considering root disease in all management plans for stands containing a majority of Douglas-fir or grand fir. Root diseases were also involved in mortality in plantations of other species.

Foliage diseases were readily apparent on many tree species this year. Many distinct areas with larch needle problems were observed in the northern part of the State while red band needle blight and Elytroderma needle cast caused severe discoloration of ponderosa pine from the Clearwater drainage south to Boise.

Dwarf mistletoe continued to be a management concern in larch and Douglas-fir in northern Idaho stands. Ponderosa and lodgepole pine, as well as larch and Douglas-fir, were affected in southern Idaho forests.

White pine blister rust is a chronic problem in host type throughout northern Idaho. New management guidelines, being developed, will help managers risk rate stands and provide appropriate alternatives for them.

Christmas tree problems declined while nursery problems increased dramatically. With increased demands for nursery stock, plantings have increased. Diseases causing minor problems in timber stands, and previously insignificant in nurseries, have become major problems in some areas.

INSECTS

BARK BEETLES

Mountain Pine Beetle

Statewide, pine mortality attributable to the mountain pine beetle continued to decline in 1983. There were, however, areas which experienced significant increases over the previous year. In northern Idaho, infestations in lodgepole pine stands on the Nezperce and Bitterroot NF's increased markedly in 1983 (Table 1). The most notable decreases occurred in southern Idaho on the Targhee NF, where estimated tree mortality declined from more than 230,000 trees in 1982 to fewer than 7,000 in 1983. Where decreases are observed, it is due to host depletion and efforts by timber managers to bring stands under management. As more formerly inaccessible and unmanaged stands are brought under management using recently developed techniques, mountain pine beetle-caused mortality should continue to decline.

On the Nezperce NF most increases in beetle-caused tree mortality were observed in lodgepole pine stands on the Elk City and Red River Ranger

Table 1.--Bark beetle infestations in Idaho, 1982-1983.

Area[1]		Mountain Pine Beetle			Douglas-fir Beetle			Spruce Beetle			Pine Engraver			Fir Engraver		
		Acres infested	Estimated mortality Trees[2]	Volume[7]	Acres infested	Estimated mortality Trees[3]	Volume	Acres infested	Estimated mortality Trees[4]	Volume	Acres infested	Estimated mortality Trees[5]	Volume	Acres infested	Estimated mortality Trees[6]	Volume
Idaho	1982	400	270	108.4	-	213	74.5	4,300	1,373	549.2	-	25	-	-	406	80.6
Panhandle	1983	60	116	10.4	-	65	22.7	110	371	148.4	-	10	-			
Clearwater NF	1982															
	1983	-	4	1.6	-	28	9.8							80	12	2.5
Bitterroot NF[8]	1982	80	113	9.4	-	44	15.4									
	1983	4,219	517	464.6	1,566	740	259.0									
Nezperce NF	1982	2,700	2,884	257.5	390	1,114	389.9				-	5	-			
	1983	6,040	6,787	580.9	1,198	2,477	866.9							-	3	60.0
Priest Lk. SF	1982							-	2	8.0						
	1983							-	74	29.6				-	5	1.0
Pend Orielle SF	1982				-	52	18.2				80	178	-			
	1983				-	1	350.0				640	1,400	-	-	20	4.0
Mica FPD[9]	1982				-	70	24.5				550	2,764	-	-	277	55.4
	1983	-	5	250.0	-	126	44.1				8,221	11,848	-	20	391	78.2
Cataldo FPD	1982	3,050	450	40.5	-	3	1.0				-	8	-	-	30	6.0
	1983	700	1,000	90.0												
W. St. Joe FPD	1982				-	77	26.9				-	382	-	-	695	139.0
	1983										400	1,424	-	160	1,629	325.8
Kendrick FPD	1982				-	22	7.7				-	180	-	-	195	39.0
	1983				-	15	5.2				795	830	-	-	725	145.0
CPTPA[10]	1982	700	442	153.3	-	567	198.4				-	5	-	-	412	82.4
	1983										-	55	-	180	115	23.0
Craig Mtns. FPD	1982	25,564	90,000	8,098.9	-	51	17.8				-	249	-	-	217	43.4
	1983	4,000	43,021	3,868.5	-	191	66.8				-	27	-	1,090	415	83.0
Maggie Cr. FPD	1982										-	50	-			
	1983													50	50	10.0
Boise NF	1982	23,000	21,178	1,355.4	210	290	41.2				902	1,263	-			
	1983	7,000	6,443	412.3	240	351	49.8				265	371	-			
Caribou NF	1982	13,800	12,964	829.7	27	40	5.7									
	1983	19,500	14,703	940.9	15	20	2.8									
Challis NF	1982	375	525	33.6												
	1983	1,300	1,190	76.2												
Payette NF	1982	29,978	30,316	1,940.2	285	534	75.8				179	217	-			
	1983	5,600	5,880	376.3	330	574	81.5									
Salmon NF	1982	22	34	2.2	54	84	11.9				247	299	-			
	1983	150	232	14.8	32	50	7.1				293	354	-			
Sawtooth NF	1982	2,500	4,097	262.2	21	42	5.9									
	1983	1,900	2,260	144.6	10	20	2.8									
Targhee NF	1982	567,000	237,025	15,169.6												
	1983	7,100	6,759	432.6	5	10	1.4									
TOTALS	1982	669,169	400,298	28,260.9	987	3,203	914.8	4,300	1,373	557.2	1,958	5,625	-	-	2,232	445.8
	1983	57,567	88,917	7,663.7	3,396	4,668	1,769.9	110	445	178.0	10,614	16,319	-	1,580	3,365	732.5

[1]All ownerships within National Forest boundaries or State Forest Protective Districts. All areas with a Forestry boundary are not necessarily flown each year.
[2]Lodgepole pine, ponderosa pine, and western white pine.
[3]Douglas-fir.
[4]Engelmann spruce.
[5]Ponderosa pine (no volume estimates available).
[6]Grand fir.
[7]MBF (thousand board feet).
[8]That portion of the West Fork RD within the State of Idaho.
[9]State Forest Protective District.
[10]Clearwater Potlatch Timber Protective Association.

Districts (RD's). On these two Districts combined, there was nearly a threefold increase in both numbers of estimated faders and infested acres. Nine areas selected for ground surveys in increasing infestations south and southeast of Elk City averaged 4.1 trees per acre killed in 1982 and 32.4 trees per acre killed in 1983--a buildup ratio of nearly 8:1. Barring management activities, more than 140 trees per acre could be killed in those areas before the infestations run their course over the next 7-10 years.

An infestation in lodgepole pine continued its increase near Dennis Mountain southwest of Magruder on the West Fork RD, Bitterroot NF. That infestation has not been evaluated on the ground, but aerial survey estimates of year-old mortality increased from fewer than 100 trees in 1982 to more than 5,000 in 1983. Scattered ponderosa pine mortality attributable to the beetle can also be found on that District.

New attacks observed in 1983 indicate the Craig Mountain infestation south of Lewiston is increasing and spreading into uninfested lodgepole and ponderosa stands. Despite that, fewer infested acres and mortality estimates were recorded during aerial surveys in 1983. Faded trees were observed in newly infested stands north of Soldier's Meadow Reservoir. Six areas in which we conducted ground surveys showed a significantly increasing trend. In those areas, 41 trees per acre in 1982 compared to 76 trees per acre in 1983 had been attacked--nearly a 2:1 buildup ratio. Though lodgepole pine stands in this area are limited, beetle populations will readily move into adjacent ponderosa pine. Some ponderosa pine stands on the lower and drier fringes of the infested lodgepole stands are already experiencing mortality.

Other mountain pine beetle infestations in northern Idaho in either lodgepole, ponderosa, or western white pine are of a more scattered or distinctly localized nature. One exception is a continuing infestation in lodgepole pine near Cataldo. That infestation is approximately at the same level as observed in 1982. As susceptible host type continues to be depleted, we anticipate the infestation will soon begin to decline.

Mountain pine beetle activity, decreasing dramatically across southern Idaho in 1983, killed fewer than 40,000 lodgepole and ponderosa pines. Major declines occurred on the Boise, Payette, Sawtooth, and Targhee NF's. On the Boise NF the major infestation persists in the Clear Creek drainage with small group mortality elsewhere on the Forest. Much of the decrease in beetle activity on the Payette NF was due to the collapse of the Paddy Flat infestation and decline in tree mortality along the Payette River south of McCall. As in previous years, tree mortality on the Sawtooth NF is concentrated along the Big Wood River from Galena Summit south to Ketchum; along Baker Creek; and near Warm Springs Creek from Dollarhide Summit to Ketchum. On the Targhee NF active infestations persist on the west side of the Teton Mountains from Badger Creek south to Teton Creek. Significant mortality is also present along the Centennial Mountains from Spencer, east to Island Park Reservoir and north to the Henry's Lake area.

Mountain pine beetle activity increased on the Caribou, Challis, and Salmon NF's. It is the most serious tree pest on the Caribou NF with almost 15,000 lodgepole pines killed. Activity is concentrated along the Salmon River and in the Camas Creek drainage on the Challis and Salmon NF's.

Mortality estimates and infested acres for each infestation, as recorded during annual aerial surveys, are found in Table 1. Locations of those infestations are noted on maps found in Appendix IV.

In 1983, field experiments were conducted on the Flathead NF (MT) and in Yellowstone NP in conjunction with Pacific Southwest Forest and Range Experiment Station to test the effectiveness of several formulations and concentrations of carbaryl insecticide and pine oil (a naturally occurring derivative of the pulping process) as preventive sprays against the mountain beetle in lodgepole pine. Detailed reports have not yet been published; however, results indicate excellent protection was obtained with three dosages each of two formulations of carbaryl, and three application techniques for each of two formulations of pine oil. Results are shown in Table 2.

Douglas-fir Beetle

Douglas-fir beetle activity in Idaho remained low and static with nearly 3,800 beetle-killed trees observed in 1983. In northern Idaho, there were two major areas of concentrated activity, both on the Nezperce NF. One area is in the Selway River drainage within the Selway-Bitterroot Wilderness Area. The beetle-attacked trees are in most of the drainages from Dog Creek, south to Elevator Mountain. The second area is south of Grangeville on the west-facing slopes of the Salmon River in the upper portions of White Bird Creek, Skookumchuck Creek, McKenzie Creek, Slippy Creek and Slate Creek. In these areas, approximately 2,500 beetle-killed trees were detected on about 1,200 acres. A biological evaluation of 12 stands in the White Bird to Slate Creek area showed an average of 36.2 Douglas-fir bark beetle killed trees/acre (2,993.6 ft^3/ac) for the period 1981-1983. Of the 12 stands, six showed an increase of attacked trees from 1982. One smaller area of activity was on State and private lands in the Joseph Plains, south of the Salmon River, where 191 trees were killed. These trees are located high on the north slopes of many drainages originating in the Joseph Plains area. Other State and private lands infested were in the North Fork of the Clearwater River near Angel Butte, Buck Butte, and in the small drainages on the northeast side of Snake Creek. All were north of Bald Mountain. Increased activity was detected in the Idaho portion of the West Fork RD, Bitterroot NF. In 1983, there were 740 beetle-killed trees observed on 1,566 acres of the White Cap and Indian Creek drainages and on the breaks of the Selway River. In 1982, there were only 44 widely scattered beetle-killed Douglas-fir in this area.

In southern Idaho, Douglas-fir beetle activity was much the same as in 1982. Infestations were generally static to declining except on the Boise NF where tree mortality increased to more than 300 trees. Specific mortality figures, as noted by aerial detection surveys, are found in Table 1.

Table 2.--Results of carbaryl and pine oil preventive spray tests, 1983.

Formulation	Concentration	Spray technique	Trees treated	Trees attacked
Sevimol®-4	2%	Bole completely sprayed	35	0
Sevimol-4	1%	Bole completely sprayed	35	0
Sevimol-4	1/2%	Bole completely sprayed	35	0
Sevin XLR®	2%	Bole completely sprayed	35	0
Sevin XLR	1%	Bole completely sprayed	35	0
Sevin XLR	1/2%	Bole completely sprayed	35	1
Control	-	Not sprayed	35	24
Pine oil (Norpine 65®)		Sprayed to a height of 2.5 m completely around bole	15	1
Pine oil (Norpine 65)		Sprayed to a height of 5.2 m on two sides of bole	15	0[1]
Pine oil (Norpine 65)		Sprayed to a height of 10.5 m on foursides of bole	15	0[1]
Pine oil (BDR-2)		Sprayed to a height of 2.5 m completely around bole	15	4
Pine oil (BDR-2)		Sprayed to a height of 5.2 m on two sides of bole	15	4
Pine oil (BDR-2)		Sprayed to a height of 10.5 m on four sides of bole	15	1[1]
Control		Not sprayed	20	6

[1]A few of these trees were strip attacked: 2, 3, and 3 respectively.

Clearwater River Blowdown

On August 10, 1983, a windstorm with tornado-force winds struck stands in the North Fork of the Clearwater River drainage along both sides of the Dworshak Reservoir. Trees were uprooted and broken from approximately John Lewis Mountain, upstream to Cedar Creek. Affected lands belong primarily to the Corps of Engineers and Idaho Department of Lands. Some are owned by Potlatch Corporation and some small parcels are National Forest land. Volume of the blowdown was estimated to be 100 million board feet, and was comprised approximately of 60 percent grand fir, 20 percent western redcedar, 10 percent Douglas-fir, and 10 percent mixed Engelmann spruce, western larch, hemlock, and western white pine. Approximately 80 percent of the trees were snapped off at some point along the trunk; the remaining 20 percent of the trees were uprooted (Fig. 1). The damage ranged from scattered, light breakage and blowdown (1-2 trees/10-20 acres) to concentrated areas where virtually every tree was affected. The heaviest damage occurred within 1 mile of the reservoir except on Smith's Ridge where trees were blown down and broken off on both the north and south slopes. Damaged trees were found to the north into Cedar Creek where it appeared the winds finally subsided.

Figure 1.--1983 blowdown, North Fork Clearwater River.

While conducting a biological evaluation in September, we found no bark beetles infesting the fresh windthrow. Apparently all flights of slash-infesting bark beetles had terminated by the date of the blowdown. The only insect consistenly found was an ambrosia beetle, apparently Platypus wilsoni, which was seen boring into the standing bases of large grand fir that had been broken off.

In the majority of the windthrown trees, specifically in those that were severed, we do not anticipate any significant bark beetle buildup as the phloem tissue will undoubtedly either dry out or deteriorate by the spring of 1984. However, we do anticipate that a hazard could exist in the stumps of broken Douglas-fir and in uprooted trees that still have some functional root contact. The stumps of the broken trees range from 5 feet up to 50 feet or more. With the history of Douglas-fir bark beetle problems in the Clearwater River drainage, we are especially concerned about affected stands of Douglas-fir in the area. Therefore, we are currently making evaluations and plans for treating with MCH (methylcyclohexanone) selected areas that may not be salvaged. MCH is an an antiaggregating pheromone which prevents attacks of the Douglas-fir beetle in downed trees.

Spruce Beetle

Spruce beetle infestations decreased markedly in 1983 on the Bonners Ferry and Priest Lake RD's, Idaho Panhandle NF's, in northern Idaho. Infested acres declined from more than 4,000 in 1982 to just over 100 in 1983. Estimated spruce faders decreased from 1,200 in 1982 to fewer than 400 in 1983. Those infested spots observed from the air are now widely scattered in the more remote, high elevation spruce stands where management activities are not planned. Ground surveys conducted after beetle flight in 1983 indicated few areas contained newly attacked trees. This marked decline in beetle populations has resulted largely from management efforts aimed at altering susceptible conditions and reducing beetle broods through the use of trap trees. On the Bonners Ferry RD, for example, in 1982 approximately 50 trap trees were dropped in Blue Joe Creek, 22 trap trees were felled in Beaver Creek, and an additional 16 trap trees were utilized in American Creek in 1983. Timely felling and judicious placement of these trap trees, and their prompt removal--along with logging to remove infested and susceptible trees--resulted in the reduction of spruce beetle populations in that area. Such management practices have resulted in reducing spruce beetle populations to endemic levels in several areas in northern Idaho.

In southern Idaho, spruce beetles were noticed in a few windthrown trees on the Payette NF. Endemic populations only were observed.

Pine Engraver

Pine engraver populations increased drastically north of Coeur d'Alene in second-growth ponderosa pine stands on mostly private land on the Rathdrum Prairie. Infested acres increased there from 550 in 1982 to more than 8,000 in 1983 (Table 1). Mortality in 1983 was estimated to total nearly 12,000 trees. Additional scattered mortality was observed this year on the Pend Oreille State Forest and in the West St. Joe and Kendrick State Forest Protective Districts. Infestations in those areas accounted for nearly 4,000 dead trees.

Pine engraver activity in southern Idaho declined in 1983. Fewer than 1,000 trees across southern Idaho were killed by this beetle. On and around the Boise NF, beetle-caused mortality was detected in the Boise Basin area on State, private, and Federal lands. Faded trees were also observed in the

Garden Valley and near Featherville. The beetle continued its increasing trend in the Colson Creek and Owl Creek drainages and in the Granite Mountain-Volter Creek vicinity on the Salmon NF.

Fir Engraver

Populations of the fir engraver fluctuate from year to year--apparently in response to conditions which weaken host trees such as root disease, drought, or defoliation. In 1983, beetle populations were generally up in relation to 1982, though these same populations are low compared to past years. One exception can be found in grand fir stands on the West St. Joe Forest Protective District, south and east of Plummer. There, faders observed from the air increased considerably--from fewer than 700 in 1982, to more than 1,600 in 1983. Throughout the remainder of northern Idaho, populations were scattered in susceptible grand fir stands. Notable groups of faders were observed in the Craig Mountains and on the Kendrick Forest Protective District (Table 1).

DEFOLIATORS

Western Spruce Budworm

In northern Idaho, budworm defoliation was confined to the Idaho portion of the West Fork RD, Bitterroot NF (Appendix V). Defoliation increased both in intensity and extent, going from 4,635 acres in 1982 to 23,878 acres in 1983 (Table 3).

In southern Idaho, the western spruce budworm defoliated approximately 2.4 million acres of Douglas-fir, grand fir, and subalpine fir. Generally, defoliation extent and intensity increased.

Infestations expanded on the Boise, Payette, Sawtooth, and Targhee NF's and on adjacent State and private lands with significant increases in the heavy defoliation category. The infestation expanded into previously undefoliated Douglas-fir stands on the Idaho City and Boise RD's, Boise NF. Stands in the West Mountain and Sunset Mountain-Pilot Peak area were heavily defoliated. On the Payette NF, a major increase in the defoliated acreage occurred on the Council and Weiser RD's. The acreage increased from 9,000 acres in 1982 to approximately 30,000 acres in 1983. Heavy defoliation was noted on the Sawtooth NF in 1983 in the Big Smokey Creek drainage west of Hailey, and in the Willow Creek area north of Fairfield. Defoliation became more extensive on the Targhee NF increasing from 486,000 acres in 1982 to approximately 560,000 acres in 1983. New areas of defoliation were observed on the Ashton RD in the Big Bend area and south of Island Park Reservoir.

Infestations on the Caribou, Challis, and Salmon NF's remained static or declined from 1982 levels with few new areas defoliated. Infested acres, as determined from aerial detection surveys, are listed, by ownership, in Table 3. In total, nearly 2.4 million acres of National Forest land and 130,000 acres of State and private land exhibited some level of defoliation.

Table 3.--Areas of defoliation by western spruce budworm as determined by aerial detection surveys, 1982-1983.

National Forest (with adjacent State & private land)		Defoliation category				
		Light	Moderate	Heavy	Total	Change
			(acres)			
Bitterroot	1982	4,635	0	0	4,635	
	1983	10,612	13,326	0	23,938	+ 19,303
Boise	1982	140,902	361,643	171,936	674,481	
	1983	140,000	290,313	380,421	810,734	+ 136,253
Caribou[1]	1982	0	106,817	38,436	145,253	
	1983	2,868	27,556	49,736	80,160	- 65,093
Challis[1]	1982	88,120	6,082	792	94,994	
	1983	79,262	7,613	1,505	88,380	- 6,614
Payette	1982	68,640	158,586	138,154	365,380	
	1983	69,684	132,875	266,444	469,003	+ 103,623
Salmon	1982	396,485	36,946	7,176	440,607	
	1983	235,040	37,117	5,510	277,667	- 162,940
Sawtooth	1982	40,892	10,723	0	51,615	
	1983	49,191	36,545	2,942	88,678	+ 37,063
Targhee	1982	116,985	187,659	181,637	486,281	
	1983	64,896	312,858	182,825	560,579	+ 74,298
TOTAL	1982	856,659	868,456	538,131	2,263,246	
	1983	651,553	858,203	889,383	2,399,139	+ 135,893

[1]Only portions of Forests flown. Actual acreage figures may be substantially higher due to infestations being present in areas not flown and light defoliation which was not detected.

An extensive egg mass survey of State and private lands and selected portions of the Boise and Payette NF indicated that the infestation generally will maintain or increase in intensity for most of that area in 1984. Portions of the infestation north of McCall may decrease in population levels.

Douglas-fir Tussock Moth

In southwestern Idaho, aerially visible defoliation in the Owyhee Mountains expanded from 4,000 acres in 1982 to 14,200 acres in 1983 (Table 4). Heavy defoliation was prevalent around South Mountain. An evaluation conducted during the fall of 1983 indicates the infestation has generally collapsed due to natural control agents. Little or no defoliation is expected in 1984.

Table 4.--Aerially visible defoliation caused by Douglas-fir tussock moth in southwestern Idaho, 1983.

Land ownership class	Light	Moderate	Heavy	Total
		(acres)		
National Forest	-	-	-	-
Other Federal	2,141	3,049	5,456	10,646
State & Private	713	1,016	1,818	3,547
TOTAL	2,854	4,065	7,274	14,193

Pheromone detection traps were placed on other lands of southwestern Idaho, i.e., Boise, Payette, Salmon, and Sawtooth National Forests, and State lands around Bellevue (Fig. 2). Preliminary trap analyses indicate increased Douglas-fir tussock moth activity in these areas.

In northern Idaho we detected no defoliation in forested areas. Visible defoliation on ornamental trees was observed at several locations in Hayden Lake, Coeur d'Alene, Moscow, south of Genesee along Highway 95, Craigmont and Nezperce.

The main activity has been in the adult male pheromone trapping program. Trapping sites are shown on Figure 2 with the results shown in Table 5. An increasing trend has continued with substantially greater catches in the area from Moscow to Plummer. Five trapping sites averaged more than 25 moths/trap (Table 5). Historically, this area has sustained the highest tussock moth populations in prior outbreaks. All other areas in northern Idaho have either remained static or decreased in trap catches.

Despite high pheromone trap catches in the five sites of the Moscow-Plummer area, we do not anticipate aerially visible defoliation in 1984. Early instar larval surveys conducted in spring, 1983, and egg mass surveys during the fall, support these conclusions. Larvae were found but only at suboutbreak levels; no egg masses were found.

Figure 2. 1983 Douglas-fir Tussock Moth Pheromone Trapping Sites

Each ★ represents a 5-trap cluster

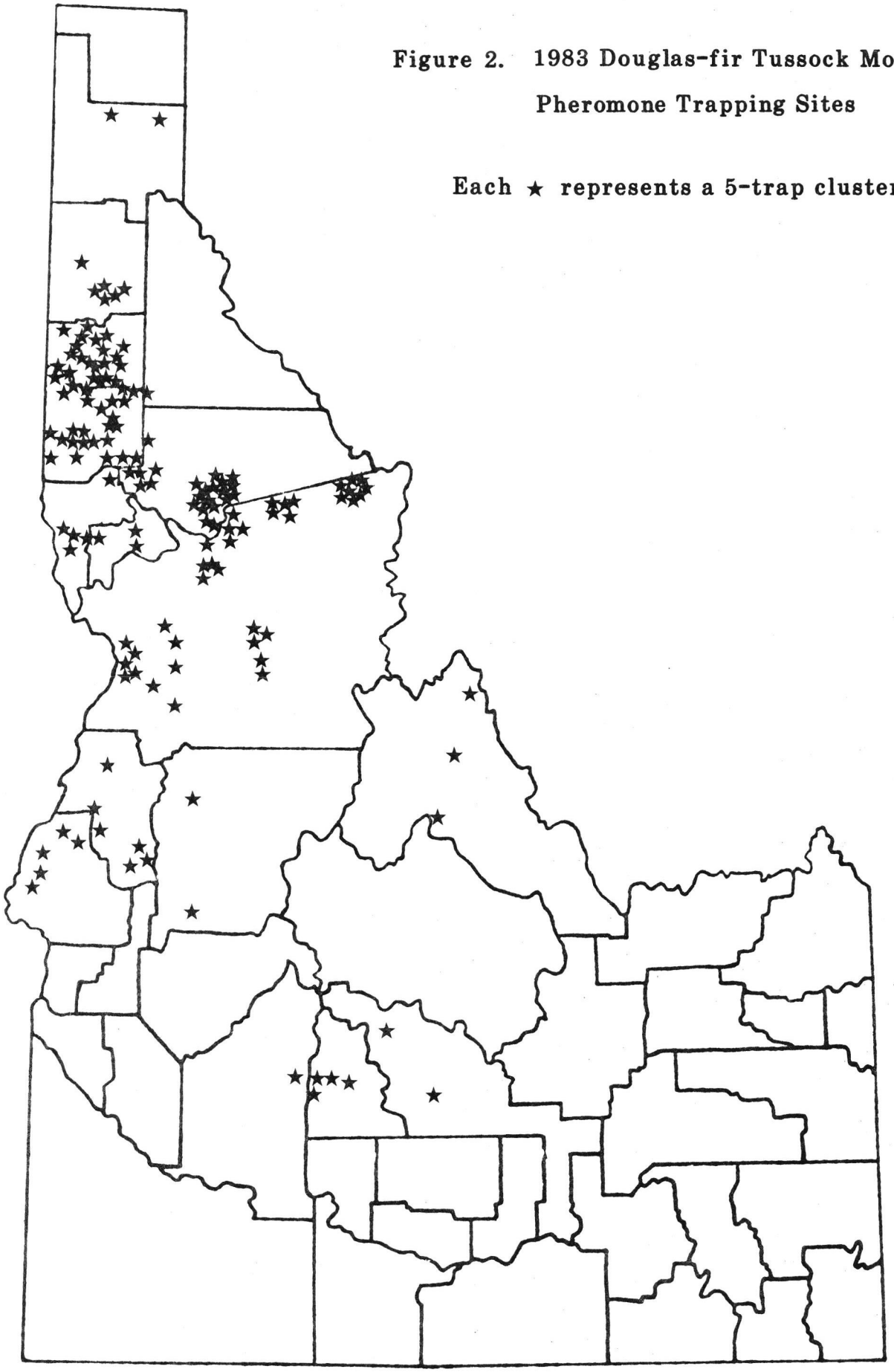

Table 5.--Average Douglas-fir tussock moth pheromone trap catches in Idaho, 1980-83.

Area	No. of sample plots	Means of average moth catch per 5 traps/sample plot			
		1980	1981	1982	1983
		STATE & PRIVATE			
Sandpoint	2	0	0	.1	0
Coeur d'Alene	3	0	0	1.0	4.2
Plummer-Moscow	15	0	.6	8.6	12.3
Plummer-Moscow	18	*	.7	2.8	3.3
Plummer-Moscow	16	*	*	*	3.9
Bellevue	1	*	19.4	16.2	39.6
Craig Mountains	7	*	2.7	.5	.5
Orofino Area S&P	12	*	2.8	5.7	*
Orofino Area S&P	3	*	*	8.1	*
		NEZPERCE NF			
Selway RD	4	.2	1.2	.7	.1
Slate Cr. RD	5	0	1.6	2.8	.6
Slate Cr. RD	6	*	*	1.3	.3
Elk City RD	3	*	*	.3	.1
Red River RD	2	*	*	0	0
Clearwater RD	1	0	0	0	0
Clearwater RD	6	*	*	.6	.6
		CLEARWATER NF			
Lochsa RD	5	*	3.6	.2	0
Canyon RD	8	*	*	8.7	*
Pierce RD	18	*	*	.3	.1
Potlatch RD	8	*	*	1.8	4.5
Powell RD	8	*	*	.3	.1
		BOISE NF			
Cascade RD	2	*	0.1	.3	2.0
Mountain Home RD	2	*	*	.3	21.7
		PAYETTE NF			
Council RD	2	*	*	43.3	38.2
McCall RD	1	*	0	.6	11.0
Weiser RD	3	*	*	43.3	42.1
		SALMON NF			
Cobalt	2	*	*	0	2.6
North Fork RD	2	*	*	11.4	38.7
		SAWTOOTH NF			
Fairfield RD	3	*	1.6	5.2	*
Ketchum RD	1	*	*	2.6	*

*Blanks indicate no traps were deployed.

Since Douglas-fir tussock moth outbreaks have been cyclic, especially in northern Idaho, plans have been developed and implemented in preparation for the eventuality of an outbreak. An indepth economic analysis was completed in 1983 using the combined DFTM-Stand Prognosis models. Yield tables were inserted into the Forest Service FORPLAN planning model to reflect the effect of the tussock moth infestations on timber values on the Clearwater NF, Palouse RD. Results of analysis show that tussock moth control is a prudent investment.

A stand hazard rating system has been developed for the Douglas-fir tussock moth in northern Idaho (Stoszek et al[1]) and has been presented to forest management personnel in training sessions. Programs for Hewlett-Packard and Texas Instruments programable calculators have been developed for field use. Implementation of this risk rating system and subsequent management activities has the potential to lower the hazards associated with tussock moth infestations.

Larch Casebearer/Larch Sawfly

Insect defoliators of western larch--notably larch casebearer and larch sawfly--appeared to have increased slightly in 1983. Because of the difficulty in distinguishing between causal agents (larch needle cast, needle blight, casebearer or sawfly) (Fig. 3) from the air, and the paucity of ground surveys, we are not sure of the extent to which these pests, individually, may have increased in the past year. Based on only a few personal observations, we believe most increases probably occurred with sawfly populations and infections of larch needle cast. Sawfly populations were confirmed in Heyburn State Park and east of St. Maries. Other isolated infestations of casebearer and infection centers of needle pathogens were likewise observed. Some of the larger concentrations of these agents affecting larch were aerially observed southwest of Sandpoint near Huckleberry Mtn. and south of St. Maries in the vicinity of Lindstrom Peak. In our one attempt to determine, on the ground, the pest or pests responsible, we found both needle diseases and both insects intermixed. We know that in the past few years, the combined effects of introduced parasites and needle diseases have contributed to reduced casebearer populations. We expect that trend to continue. Past experience has shown some significant short-term damage caused by the larch sawfly, but epidemics are usually short-lived. Needle diseases of larch, in general, are more severe in years of above average precipitation which favor spore dispersal. In 1984, we will continue to monitor these pests with increased emphasis on determining which ones are more prevalent.

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[1] Stoszek, K. J., P. G. Mika, J. A. Moore, and H. L. Osborne. 1981. Relationships of Douglas-fir tussock moth defoliation to site and stand characteristics in northern Idaho. For. Sci. 27(3): 431-441.

Figure 3.--Damage found on larch foliage in 1983; left (top and bottom), larch sawfly; middle, larch casebearer; right, Meria needle cast.

Pine Butterfly

In 1983, as in 1982, numerous pine butterflies were observed in many ponderosa pine stands on the Boise, Payette, and Salmon NF's. The population was widespread and larval feeding resulted in 16,280 acres of ponderosa pine defoliation. On the Boise NF, defoliation declined somewhat around Dry Buck Summit, an area of ponderosa pine which was heavily defoliated in 1982. In contrast, 3,200 acres of ponderosa pine on State, private, and Federal lands around Cascade were heavily defoliated for the first time in 1983. Appendix V outlines this defoliation as noted during aerial detection surveys. Approximately 80 acres of defoliation were observed in the Owl Creek drainage on the Salmon NF. Evaluations conducted in the fall, 1983, indicate the infestation will persist in 1984 in spite of regulatory pressure being exerted by predators and parasites.

MISCELLANEOUS INSECTS

Balsam Woolly Adelgid
(formerly Balsam Woolly Aphid)

A forest pest new to the State, the balsam woolly adelgid (Fig. 4) was found this year in northern Idaho. In February 1983, it was observed on several ornamental subalpine firs in Coeur d'Alene. In August 1983, it was reported at five separate locations east of Moscow. These locations are:

1. Little Boulder Campground, 2 miles south of Helmer.

2. Along Idaho Highway 8, approximately 2 miles south of Bovill.

3. Along Idaho Highway 8 at Cameron Creek, approximately 4 miles west of Elk River.

4. East of Elk River 2 miles up Partridge Creek.

5. Along the road near Long Meadows approximately 7 miles south and 2 miles east of Bovill.

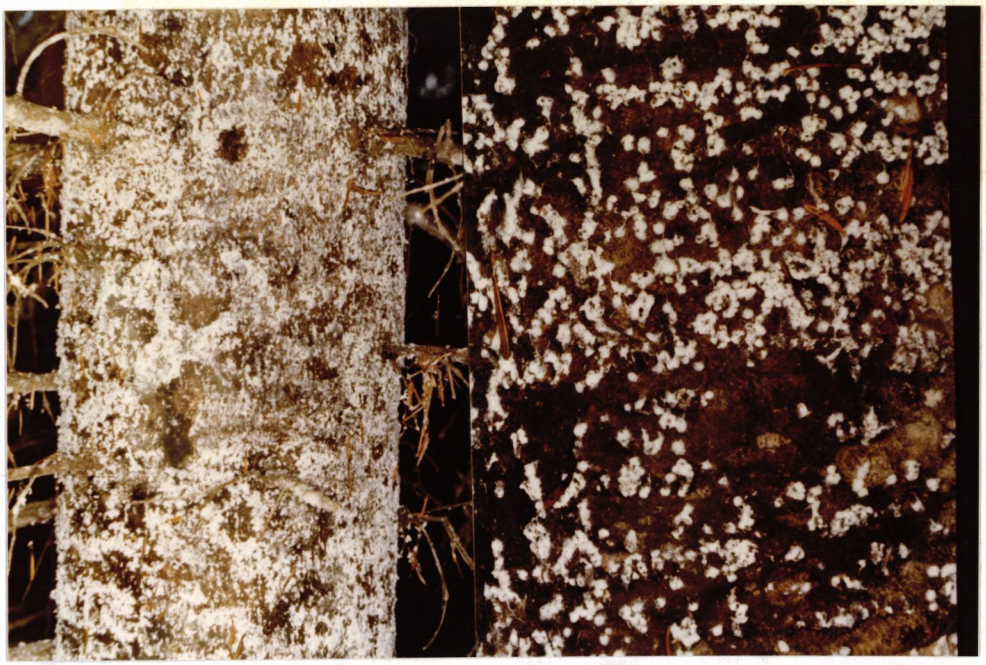
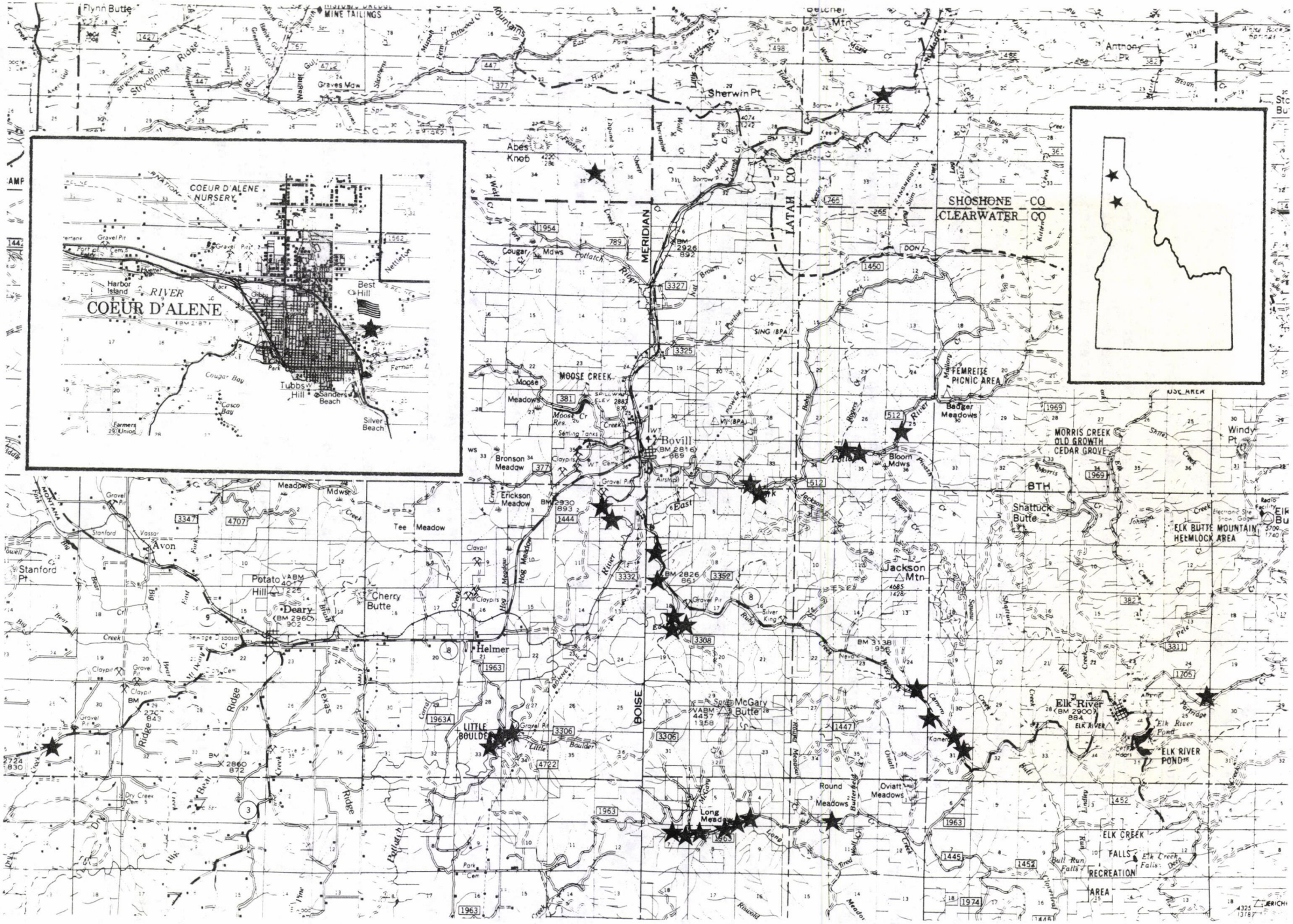


Figure 4.--Balsam woolly adelgid.

Detection surveys conducted later in the year, both from the air and on the ground, have found the insect at many other locations from east of Deary, north to Clarkia (Fig. 5). At all sites the principal host is subalpine fir with grand fir being infested to a much lesser degree and only when it was in close proximity to infested subalpine fir. In several locations there were individual subalpine fir that were dead with the only apparent cause being the balsam woolly adelgid infestation. Damage characteristics on infested trees in Coeur d'Alene and at Little Boulder Campground revealed that the insect has been present in Idaho for at least 5 years.

Further detection surveys and a damage evaluation will be conducted in 1983-84.


COEUR D'ALENE
NURSERY
RIVER
COEUR D'ALENE
Harbor Island
Best Hill
Tubbs Hill
Sanders Beach
Silver Beach
Cougar Bay
Casco Bay
Flynn Butte
MINE TAILINGS
Graves Mdw
Sherwin Pt
Abes Knob
Cougar Mdws
Potlatch River
MERIDIAN
LATAH CO
SHOSHONE CO
CLEARWATER CO
MOOSE CREEK
Moose Meadows
Bovill
Bronson Meadow
Erickson Meadow
Tee Meadow
Avon
Stanford Pt
Potato Hill
Deary
Cherry Butte
Helmer
LITTLE BOULDER
BOISE
McGary Butte
Jackson Mtn
Shattuck Butte
Elk River
ELK RIVER POND
Round Meadows
Oviatt Meadows
Long Meadow
FEMREITE PICNIC AREA
Badger Meadows
Bloom Mdws
MORRIS CREEK OLD GROWTH CEDAR GROVE
ELK BUTTE MOUNTAIN HEMLOCK AREA
ELK CREEK FALLS RECREATION AREA
Windy Pt
Anthony Pk
Belcher Mtn
Stanford
Vassar
Texas Ridge
Strychnine Ridge
Dry Creek
Potlatch
Little Boulder
Big Meadow Creek
Hog Meadow Creek
Moose Cr Res.
Bloom Cr
Johns Creek
Elk Creek
Elk River
Elk River Pond
Bull Run Falls
Elk Creek Falls
Portage Creek
Ruby Creek
Silver King
Gravel Pit
Claypit
Airstrip
Ranger Sta
Cem
Park
Spr
Sch
Radio Facility
Electronic Site
Snow Gage
BM 2826 861
BM 2930 893
BM 2926 892
BM 2816 869
BM 3138 956
VABM 4457 1358
VABM 4077 1225
BM 2900 884
BM 2860 872
BM 2760 843
BM 2930 902
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3306
3311
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1974
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1954
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1963

Western Pine Shoot Borer

Western pine shoot borer infestations were found at very high levels in several ponderosa pine plantations throughout the State in 1983. These surveys were conducted in conjunction with efforts to control this pest using pheromones as a male confusant. Eleven plantations were evaluated with pretreatment infestation levels ranging from 33-79 percent of the leaders being attacked (mean infestation level = 53.8 percent).

The control project was primarily aimed at infestations in three ponderosa pine plantations which are part of the Inland Empire Tree Improvement Cooperative. The three plantations, Lone Mountain north of Coeur d'Alene, Tensed approximately 45 miles south of Coeur d'Alene, and Meadow Creek northeast of Grangeville were treated to reduce the effect of shoot borer damage on the assessment of growth characteristics. A primary purpose of these plantations is the determination of the growth properties of several genetic strains planted there. Western pine shoot borer infestations are confusing those determinations. This effort will continue for 2 more years.

Gypsy Moth

As in prior years, there were no gypsy moths found in Idaho in 1983; however, the need to continue detection efforts is definite as this pest has now been found close to Idaho. A small infestation was discovered in Pullman, Washington in 1983, and it has also been found at two locations in northwestern Montana.

Black Pineleaf Scale

The black pineleaf scale caused extensive damage to several stands of ponderosa pine in the Clearwater River drainage. The heaviest damage was along the Potlatch River near Kendrick where 80-100 acres were heavily infested. The needles were very necrotic and many trees were heavily defoliated. Another area of lighter damage was west of Lenore, high on the slopes overlooking the Clearwater River. Despite the weakened nature of the trees, which could predispose the trees to bark beetle attacks, to date none have been observed in the infested area. For several years this pest has been killing trees at the Lenore Rest Stop between Lewiston and Orofino on U.S. Highway 12.

Douglas-fir Needle Midge

As in 1982, Douglas-fir needle midge infestations were observed scattered throughout Douglas-fir stands in northern Idaho in 1983. Little is known about the factors contributing to population fluctuations, though they seem to increase and decrease cyclically at about 10-year intervals. Populations of the midge remain high for 2 to 3 years, then decline. Inasmuch as this is the second year of high populations in northern Idaho, we expect a reduction in 1984. The needle midge was at one time a serious pest in Douglas-fir Christmas tree plantations. The decline in the number of these plantations, however, has reduced the economic significance of the Douglas-fir needle midge.

Cranberry Girdler Moth

The cranberry girdler moth, first identified in 1980 at the Coeur d'Alene Nursery in 2-0 Douglas-fir seedling beds, was once again evaluated in 1983. Of 7,841 2-0 seedlings examined, 641 (8.2 percent) had been injured through feeding activity of the girdler moth larvae. An additional evaluation of 3-0 Douglas-fir and 2-0 western larch stock showed only 0.6 percent and 0.7 percent respectively, damaged by larval feeding. Results of the 1983 survey indicate that 2-0 Douglas-fir seedlings are more likely to be infested, and further, that injury levels in that stock appear to be increasing with succeeding generations of the girdler moth. Because a seedling exhibiting any amount of damage is culled, feeding damage is becoming more significant. A control program consisting of both cultural and insecticidal measures has been proposed.

Pine Needle Sheathminer

Over 800 acres of lodgepole pine were defoliated on the Caribou and Targhee NF's in southern Idaho. No infestations were recorded in the northern portion of the State though populations are observed from time to time in both lodgepole and ponderosa pine.

Sugar Pine Tortrix

New foliage of scattered sapling and pole-sized lodgepole and ponderosa pines was defoliated throughout the State. No major infestation centers were noted, though serious outbreaks have occurred in past years. These infestations will be monitored in 1984 to detect population increases which may occur.

Red Turpentine Beetle

The red turpentine beetle, usually associated with basal attacks on mature to overmature ponderosa pine, was encountered this year in a relatively atypical situation. At the Tensed plantation, a number of young ponderosa pines (approximately 15 yrs. old) were killed in a small group. Examination revealed red turpentine beetle attacks at the base of each. No other pest--insect or disease--was observed. It is probable the trees were stressed and so became attractive to the beetle. It is unusual, however, for this particular beetle to be attracted to such small trees. Should this "infestation" continue, it could present a significant problem in this or similar plantations.

DISEASES

Root Diseases

Root diseases are the primary cause of mortality in many of Idaho's commercial forests and are the major concern of many forest managers. Losses are especially severe in the northern part of the State where mixed conifer stands are attacked by several root disease fungi. The prinicipal root diseases are Armillaria root disease, laminated root disease, black stain, brown cubical butt rot, and annosus root disease. These diseases frequently occur together or in combination with bark beetles. Trees weakened by root disease become easy targets for bark beetles. The prinicipal hosts are Douglas-fir and grand fir followed by hemlock, spruce, other true firs, white pine, other pines, larch, and western redcedar.

It is difficult to properly assess actual impact of root diseases but surveys in northern Idaho indicate that about 35 percent of all tree mortality is associated with root diseases. Extrapolation from past surveys indicate root diseases are a management concern on nearly 2 million acres (25 percent) of the commercial forest land in northern Idaho. These diseases are also a potential concern on another 1 million acres of Douglas-fir and grand fir types. Volume losses have not been quantified.

Since root diseases are a major concern to most foresters, several projects have been initiated to provide information to help deal with root disease situations. The following is a summary of most of our root disease activities in Idaho during the past year.

Several timber sales on State land in northern Idaho were surveyed with local managers to identify root diseases and provide recommendations for reducing losses from diseases.

Presuppression surveys were conducted within root-diseased stands in the Marie Creek drainage of the Fernan RD, Idaho Panhandle NF's. Surveyed stands contained extensive laminated root rot, Armillaria root disease, and brown cubical butt and root rot. Survey information regarding root disease identity, location, and severity on different tree species was provided to assist in developing silvicultural prescriptions to reduce losses.

Mature Douglas-fir on the Nez Perce Indian Reservation in north central Idaho were evaluated for presence of root diseases. Root systems of 20 trees with little or no crown symptoms indicative of root disease were examined after being excavated with a D-6 tractor. All root systems were infected with brown cubical butt and root rot. Some trees with no apparent crown symptoms had 80-90 percent of their root systems infected. Black stain root disease was also found on some roots. This evaluation indicates that many severely infected trees may go unnoticed because they may not exhibit any crown symptoms.

Pockets of Armillaria and laminated root disease were identified in a survey of a prospective timber sale on State land in the Hoodoo Mountains south of the Pend Oreille River. Since watershed and visual constraints severely limited the amount of cutting permitted, the manager was advised to first concentrate on salvaging all Douglas-fir and grand fir from the areas with high amounts of infection and to avoid selective cutting of any areas with root disease.

Selective cutting of susceptible species in root disease areas is usually not recommended because many leave trees may be killed before the stand receives a regeneration cut. An example of this situation occurred within the Pleasant Creek drainage, Fernan RD, Idaho Panhandle NF's, where root-diseased stands had been partially cut 7 years ago. Estimates of annual rate of mortality due to laminated root rot and Armillaria root disease indicated that about 2 percent of the selected leave trees have died each year since cutting, and susceptible regeneration and brush have developed which may cause additional regeneration problems.

Effects of partial cutting of subalpine fir stands severely infected with Armillaria and annosus root diseases are being monitored on the Red River RD, Nezperce NF. Plots were established in cut and uncut portions of stands to compare root disease spread and associated mortality.

Several studies have been initiated to monitor root disease activity in a variety of situations. Most of these studies involve the establishment of permanent plots in and around infected areas to obtain periodic data on symptom development and tree mortality.

In an Idaho Department of Lands (IDL) study of 112 plots around infected trees in known root disease areas, 60 to 90 percent of the volume had been lost to root diseases. Most of this loss occurred during an unquantified time period prior to plot establishment 3 years ago. The remainder has occurred at a relatively constant rate over the last 3 years. Each plot is centered on a tree exhibiting some degree of crown symptoms. Each tree has been permanently tagged and photo points have been established to record annual progression of crown symptoms. A photographic record of basal symptoms such as pitching or discolored spots has also been established to document total symptom progression and to look for relationships with crown symptoms. After 3 years of observation nearly one-half of the symptomatic plot center trees have died and more than two-thirds of the rest are exhibiting more severe symptoms.

Permanent plots are also being established in young-growth stands of several tree species where root disease mortality has been observed. Information obtained will enable us to follow the progress of the root disease and effects on different hosts.

In northern Idaho, Armillaria root disease is the most frequent cause of mortality in young plantations and is often associated with improperly planted trees or off-site planting stock. Periodic surveys in State plantations of ponderosa pine near Spirit Lake show that losses have not been significant and are decreasing as stands mature.

Last summer the Forest Service established four study areas in the Priest Lake area within 10- to 20-year-old plantations of larch, ponderosa pine and white pine. Plans call for precommercially thinning these stands and monitoring the results at 5-year intervals.

Effects of thinning on Armillaria root disease dynamics in a mixed-conifer plantation are being evaluated on the Red River RD, Nezperce NF. Thinned and unthinned plots were established to compare disease spread and rate of tree mortality.

Annosus root disease is the most common root disease associated with mortality in southern Idaho pine plantations. A longevity and spread study in the Bureau of Land Management Idaho City ponderosa tree improvement plantation established in 1966 indicates annosus root disease is still active with an apparent radial spread rate of 1-2 feet per year. Since the first root disease mortality study of the plantation in 1976, fewer numbers of trees have been killed each year. New detections of annosus root disease-caused pine mortality were found on the Boise NF in the Tiger Creek, Humbug Gulch, Horse Heaven Creek, and Big Owl Creek drainages and on the Payette NF in the Seid Creek and Filly Creek drainages.

In southern Idaho, Armillaria root disease is being found with increasing frequency. In 1983, Armillaria root disease was found in ponderosa pine regeneration southeast of Fourbit Summit on the Boise NF, and in grand fir on Boise Cascade Corporation lands near Hurdy Creek southwest of Cascade, Idaho. In plantations of off-site species, site conditions may stress trees so that root diseases and other pests become problems. Although trees may grow well initially, plantations often suffer increasing mortality as trees mature. This appears to be the situation in the Priest River RD, Idaho Panhandle NF's, where about 3,000 acres of ponderosa pine were planted in the 1930's and are now suffering extensive mortality. Dying trees were often infected with Armillaria root disease and Lophodermium needle cast. Cankers on branch tips were also common as well as attacks by red turpentine beetles. Although trees grew well for the first 10-15 years, deterioration of the stand at this time is probably due to use of off-site planting stock. A similar situation is occurring with off-site ponderosa planted in the Bovill area. High mortality rates have occurred for several years and are primarily due to black stain root disease.

Brown cubical butt rot is frequently associated with mortality of mature Douglas-fir. In overmature stands, sporophores may be found growing from the duff near infected trees. Weakened trees become prime targets for the Douglas-fir beetle and may be a primary factor in maintaining endemic bark beetle population levels. Weakened trees also become susceptible to windthrow which may expose the typical red-brown cubical decay in the roots and butt of the tree.

In northern Idaho brown cubical butt rot is often found in complexes with other pests but it is being found more frequently as a primary cause of mortality in southern Idaho stands. In 1983, decay and sporophores were found on the Payette NF east of Cougar Mountain and around Railroad Saddle, on the Salmon NF in the W. Fork of Blackbird Creek drainage; and on the Targhee NF around Rattlesnake Creek, Spruce Creek, and Eccles Butte.

Douglas-fir mortality in the higher elevation spruce and subalpine fir sites was often associated with tomentosus root disease in combination with brown cubical butt rot. The white pocket decay caused by tomentosus root disease was frequently observed in roots of dead and dying Engelmann spruce, true firs, and Douglas-fir on the higher elevations of the Boise, Payette, and Salmon NF's. Sporophores were found on these sites during late August through early September.

Although larch is generally considered one of the most root disease resistant species, stands of overstocked mature western larch on the Priest Lake and Fernan RD's, Idaho Panhandle NF's, had extensive root decay and mortality. The associated fungus (Resinicium bicolor (Fr.) Parm.) caused a reddish-brown discoloration in the interior of roots, similar to that caused by brown cubical butt rot. Although little is known about the biology of this decay fungus, it will be subjected to further investigation in 1984.

FOLIAGE DISEASES

Larch Foliage Diseases

Discoloration of western larch foliage caused by a combination of larch casebearer, larch sawfly, Hypodermella needle blight, and Meria needle cast (Fig. 3) was common in northern Idaho, particularly north of Bovill and within the Elk Creek drainage north of Elk River. Discoloration occurred on groups of trees rather than being general over most larch stands as in years past. Meria needle cast also caused very low levels of discoloration and defoliation on the Boise and Payette NF's in southern Idaho.

Red Band Needle Blight

Occurrence of red band needle blight was severe on ponderosa pine within portions of the Clearwater NF along the Lochsa River, north of Priest River, and near the confluence of Lightning Creek and the middle fork of the Payette River in southern Idaho. This disease has been very noticeable within and adjacent to the Wilderness Gateway Campground (Clearwater NF) for the past several years. Apparently, some mortality of young pine has occurred as a result of this disease. Photo plots were established in 1982 to monitor symptom development, growth, and possible mortality of trees severely infected with red band needle blight. Selected trees are photographed annually to provide a record of changes in disease intensity over time. From this record, predictions of probable future losses will be made to help managers decide about the necessity to institute control measures.

Elytroderma Needle Cast

Elytroderma needle cast causes brooms and chronic needle discoloration and premature loss within stands of ponderosa pine in many areas of Idaho. Severe damage has occurred near Lost Trail Pass (Salmon NF) and in the Mores Creek and Johnson Creek drainages and near Clear Creek on the Boise NF.

Grand Fir Needle Cast

Needle cast of grand fir Christmas trees being grown at several locations north of Sandpoint was quite noticeable. Samples were submitted to Dr. A. Funk, Canadian Forestry Service, for identification of fungi on cast needles. Identification is not yet complete.

Swiss Needle Cast

This disease caused prominent yellowing and premature loss of Douglas-fir foliage within several stands in northern Idaho. Concentrated damage was noticed near Coeur d'Alene and within the Priest River Experimental Forest. Greatest impact from this disease occurs in areas managed for Christmas trees.

Miscellaneous Foliage Diseases

Other noteworthy foliage diseases in Idaho include lodgepole pine needle cast, needle rust of true firs, true fir and spruce broom rust, Rhabdocline needle cast of Douglas-fir, greybeard of ponderosa pine, and ink and Marssonia leaf spots of aspen. All these foliage diseases are scattered throughout the host type and usually fluctuate in intensity from year to year. During 1983, levels of damage from these diseases were generally light.

DWARF MISTLETOES

Dwarf mistletoes attack most of the major commercial tree species throughout Idaho. Severe infections can reduce tree growth, wood quality, and cone crops, and may predispose trees to attack by other agents. Aerial detection surveys do not include dwarf mistletoes because light infections cannot be seen and dense stands frequently mask even heavily infected trees. Although mortality is rare, growth reduction in heavily infected stands may be substantial. Losses can be greatly reduced by silvicutural practices.

In 1983, presuppression surveys and suppression projects were conducted in all seven NF's in southern Idaho. More than 177,000 acres were surveyed and about 1,500 acres were treated (Table 6).

Table 6.--Acres of dwarf mistletoe presuppression surveys and suppression projects conducted in southern Idaho during 1983.

National Forest	Presuppression survey acres	Suppression project acres
Boise	65,000	400
Caribou	6,400	140
Challis	92	0
Payette	18,500	275
Salmon	16,315	67
Sawtooth	200	18
Targhee	70,522	662
TOTAL	177,029	1,562

The IDL conducted a followup survey on permanent dwarf mistletoe plots in the Pine Creek drainage near Idaho City and the Deer Creek drainage east of Banks. Fifty of the 200 plots established 3 years ago were remeasured to determine the effectiveness of Douglas-fir dwarf mistletoe reduction projects and obtain information about rates of spread and intensification in treated stands. Most of the treated areas had greatly reduced levels of infection; data collected indicated no appreciable increase in spread or intensification over the past 3 years.

STEM CANKERS

White Pine Blister Rust

Losses from white pine blister rust have declined over the past few years as much mature white pine has been logged and stands have been regenerated with a mixture of other species. However, white pine is a highly desirable, fast-growing species which will continue to be encouraged for timber production on many sites. A management guide for white pine stands is being developed by personnel of the Intermountain Forest and Range Experiment Station, Northern Regional Office, and the Clearwater NF. This guide will contain information on hazard rating stands for blister rust and provide alternatives for dealing with diseased stands.

Also under consideration for special situations are control procedures such as pruning infected branches, excising cankers, thinning infected trees, silvicultural methods to reduce Ribes, and tree species manipulation.

Stalactiform Rust Canker

Stalactiform rust continues to be a problem in dense stands of lodgepole pine, particularly throughout central Idaho.

Comandra Rust Canker

This disease is similar to stalactiform rust and can be found on ponderosa and lodgepole pine in eastern Idaho.

Western Gall Rust

Western gall rust is found throughout the State on ponderosa and lodgepole pine. Branch galls are most frequently observed and may result in some branch dieback on larger trees. Stem cankers often are seen on young regeneration but mortality is usually low. Occasionally we find areas where large numbers of mature trees have "hip cankers" caused by old bole infections which have never healed.

In a recent hazard tree survey in Winchester State Park, we found over 100 large stem-cankered trees. Since most of these trees were within a campground and constituted a hazard to visitors, they were recommended for removal.

Western gall rust has also been observed on Scots pine Christmas trees. Because of their short rotation cycle, galls rarely cause any problems; but a few trees are usually culled due to cankers while others may receive a grade reduction or need extra attention during shearing.

Atropellis Canker

Atropellis canker occurs on lodgepole pine sporadically throughout the State. Infection levels are usually low and impact on stands is not severe. However, a pole-sized stand of lodgepole south of Grangeville had very high infection levels in 1983. Over 90 percent of the trees were infected and many had several distinct bole cankers. No apparent mortality was observed, but periodic observations will be made to see if trees are killed or attacked by mountain pine beetle.

Cytospora Canker

Cytospora canker causes branch dieback in many hardwood species. In 1983, it was observed in southern Idaho causing branch mortality in several stands of aspen.

Dasyscypha Canker

Dasyscypha cankers were found infecting snow-damaged ponderosa pine regeneration on the Boise NF and on limbs and the upper bole on several Douglas-fir in the Clearwater area. Although cankers can be commonly found on several conifer species, damage is usually minor.

DECAYS

Indian Paint Fungus

Indian paint fungus continues to be a major decay problem in mature true firs and hemlock throughout the State. Infected trees that become hazards in recreation areas must be removed.

Red Ring Rot

Red ring rot is a common stem decay on firs, pines, Douglas-fir, spruce, and western larch throughout the State. In southwestern Idaho it has also been found in combination with annosus root disease on roots and butts of infected trees.

Aspen Trunk Rot

Aspen trunk rot is found on aspen throughout the State but is especially common in southern Idaho where there are large stands of aspen. It was prevalent in stands of aspen throughout the Sawtooth NF.

NURSERY DISEASES

Grey Mold

Grey mold was the most important disease of containerized conifers at the Coeur d'Alene Nursery. Losses of western larch were common. Laboratory tests were conducted to determine possible development of tolerance by isolates of the grey mold fungus to three fungicides that will probably be used more frequently in the future to control this disease (iprodione, vinclozolin, dicloran). Fungal isolates were obtained that developed tolerance to all three fungicides, even up to concentrations of 10,000 ppm. Fungicide schedules should alternate chemicals and use the lowest effective dosages to prevent development of tolerant fungal strains.

Meria Needle Cast

Meria needle cast caused severe losses to 2-0 bareroot western larch seedlings at the Coeur d'Alene Nursery. Prolonged cool, wet weather provided ideal conditions for infection and buildup of the pathogen. Extensive mortality and reduced size of seedlings occurred. Chlorothalonil was used to control the disease, but was not very effective because of the abundant inoculum available and ideal conditions for infection.

Sirococcus Tip Blight

Sirococcus tip blight was found for the first time on containerized Engelmann spruce seedlings at the Coeur d'Alene Nursery. Symptoms were similar to post-emergence damping-off and damage was slight. Sirococcus tip blight was not as serious as last year at two private nurseries near Bonners Ferry because of treatments with chlorothalonil and effective sanitation practices to reduce inoculum.

Diplodia Tip Blight

Severe damage to 1-0 bareroot ponderosa pine seedlings caused by Diplodia tip blight occurred at the Fantasy Farms Nursery near Peck. Affected seedlings had leader necrosis followed by dieback and mortality. Symptoms were similar to Sirococcus tip blight.

Fusarium Root Disease

Fusarium root disease was common on both containerized and bareroot seedlings at several nurseries. On some infected containerized Douglas-fir, only slight needle tip necrosis occurred with little mortality. Grouped mortality of 2-0 grand fir seedlings occurred at the Fantasy Farms Nursery, although losses were not extensive.

Phoma Blight

Phoma blight occurred on the tips of bareroot seedlings at several nurseries. Leader dieback and occasional mortality resulted. Losses were especially severe on Mugho pine at the Fantasy Farms Nursery.

INLAND EMPIRE TREE IMPROVEMENT COOPERATIVE OUTPLANTINGS PEST SURVEY

The Inland Empire Tree Improvement Cooperative is a group of Federal, State, and private agencies throughout the Intermountain/Pacific Northwest area dedicated to the production of more and improved tree seed. Resources have been pooled in the establishment of test plantations, seed orchards, and seed production areas. A number of these areas were visited by entomologists and pathologists in 1983 in an effort to determine the nature and extent of insect and disease problems. Where appropriate, management recommendations were made. A listing of locations visited and findings are:

Progeny Test Plantations

Tollgate (Nezperce NF) - Heavy pocket gopher damage to grand fir was observed. Some unidentified defoliator damage was noted. It was probably western spruce budworm or Dioryctria spp.

Ruby Creek (Idaho Pine Timber Assoc.) - Grand fir plantings were inspected. Approximately 10 percent were missing or dead from unknown causes.

Lone Mountain (Idaho Panhandle NF's) - Extensive western pine shoot borer damage and needle disease (Lophodermella concolor) were observed in lodgepole plantings we examined.

Meadow Creek (Nezperce NF) - Ponderosa pine examined was heavily infested with western pine shoot borer (approximately 35 percent of terminals). Douglas-fir had serious Rhabdocline infections. Some Douglas-fir needle midge and Cooley spruce gall aphid damage was noted. No problems were found in lodgepole pine examined.

Tensed (State of Idaho) A pretreatment survey, early in 1983, showed 51 percent of the ponderosa pine terminal shoots examined were infested by western pine shoot borer. A few trees had been killed by red turpentine beetle.

Quartz - (Kootenai NF) - Western white pine we inspected had a small amount of needle cast. Some mortality had occurred but cause was not determined.

Little Guard (Idaho Panhandle NF's) - Douglas-fir examined had no insect or disease problems though frost damage was prevalent.

Seed Orchards

Sandpoint (Idaho Panhandle NF's) - One western white pine stand was inspected. There was a very light cone crop in 1983; some damage to those cones caused by cone worms and cone beetles was noted.

Lone Mountain (Idaho Panhandle NF's) - Approximately 55 percent of the ponderosa pine terminals we examined were infested with western pine shoot borer.

Coeur d'Alene Nursery - Extremely heavy seed bug populations were observed on western white pine cones inspected.

Moscow Aboretum - Heavy damage to western white pine cone crops was observed. Damage was caused by a combination of seed bugs, seed worms, and cone worms.

Russell Bar (BLM) - Ponderosa pine plantings were lightly infested (less than 2 percent) by western pine shoot borer. Some grasshopper feeding was observed.

Seed Production Areas

Three Douglas-fir seed production areas on the Nezperce NF (Wheeler Mountain, Campbell Creek, and Potato Hill) were examined in 1983. No cones were produced at any of those locations.

COOPERATIVE TRAINING

In an effort to more adequately assist field-going personnel and forest managers in detection, identification and management of forest pests, the Idaho Department of Lands and Forest Service, Northern Region began an intensified cooperative training program in northern Idaho in 1982. The northern part of the State was divided into three "zones," with training sites located at Sandpoint/Priest River, St. Maries, and Grangeville/Orofino. The training program was then separated into two types of sessions: A "basic" session in which field identification and life cycles of pests are stressed, and an "advanced" session during which management alternatives are emphasized. The basic session is designed primarily for field-oriented personnel such as stand exam crews. The advanced session is conducted for silviculturists, foresters, and others involved in stand management.

In 1982, basic sessions were held at St. Maries and Grangeville. An advanced session was conducted at the Priest River Experimental Forest. Sessions alternate at each site each year, so in 1983, a basic session was held at Sandpoint and advanced sessions were at St. Maries and Grangeville.

Instructors for these sessions are entomologists and pathologists from the staffs of the cooperating agencies. In order for instructors to be most effective and participants to obtain as much information as practicable, attendance at these training sessions is limited to approximately 30 participants each.

The basic session is usually 2 days in length with approximately half the time spent indoors in a typical lecture format. The remainder is devoted to field identification and discussion.

The advanced sessions have become more like workshops than typical training sessions. These sessions are held for 3 days with approximately one-third of the time devoted to indoor lecture/discussion periods. The remainder of the time is spent outdoors where practical exercises are held. Each participant becomes a member of a team assigned to develop prescriptions for specific stands. Insect and disease management alternatives, in conjunction with other resource considerations, are used.

In southern Idaho (Intermountain Region), Forest Pest Management personnel presented insect and disease recognition training to individuals on several National Forests.

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Ann Keysor - Biological Technician

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III. INDEX OF INSECTS AND DISEASES

INSECTS

Common name	Scientific name
Balsam woolly adelgid (formerly balsam woolly aphid)	*Adelges picea* (Ratzburg)
Black pineleaf scale	*Nuclaspis californica* (Coleman)
Coneworms	*Dioryctria* spp.
Cranberry girdler moth	*Chryusoteuchia topiara* Zeller
Douglas-fir beetle	*Dendroctonus pseudotsugae* Hopk.
Douglas-fir needle midge	*Contarinia pseudotsugae* Condrashoff
Douglas-fir tussock moth	*Orgyia pseudotsugata* McDunnough
Fir engraver	*Scolytus ventralis* LeConte
Gypsy moth	*Lymantria dispar* (L.)
Larch casebearer	*Coleophora laricella* (Hub.)
Larch sawfly	*Pristiphora erichsonii* (Hartig)
Mountain pine beetle	*Dendroctonus ponderosae* Hopk.
Pine butterfly	*Neophasia menapia* (Felder & Felder)
Pine engraver	*Ips pini* (Say)
Pine needle sheathminer	*Zelleria haimbachi* Busck.
Red turpentine beetle	*Dendroctonus valens* LeConte
Seed bugs	*Leptoglossus* spp.
Seed worms	*Eucosma* spp.
Spruce beetle	*Dendroctonus rufipennis* (Kirby)
Sugar pine tortrix	*Choristoneura lambertiana* (Busck)
Western pine shoot borer	*Eucosma sonomana* Kearfott
Western spruce budworm	*Choristoneura occidentalis* Freeman.

DISEASES

Annosus root disease	Fomes annosus Fr. Cke. (=Heterobasidion annosum (Fr.)Bref.))
Armillaria root disease	Armillaria mellea (Vahl. ex Fr.)
Aspen trunk rot	Phellinus tremulae (Bond) Bond & Boriss
Atropellis canker	Atropellis piniphila (Weir) Lohm. & Cash
Black stain root disease	Verticicladiella wageneri Kend.
Brown cubical butt rot	Phaeolus schweinitzii (Fr.) Pat.
Comandra rust	Cronartium comandrae Peck.
Cystospora canker	Cytospora chrysosperma Pers. ex. Fr.
Dasyscypha canker	Dasyscypha sp.
Diplodia tip blight	Diplodia pinea (Desm.) Kick
Dwarf mistletoes	Arceuthobium spp.
Elytroderma needle cast	Elytroderma deformans (Weir) Darker
Fir broom rust	Melampsarella caryophyllacearum Schroct.
Fir needle rust	Pucciniastrum spp.
Fusarium root disease	Fusarium oxysporum Schlect.
Grey beard	Lophodermium sp.
Grey mold	Botrytis cinerea Pers. ex Fr.
Hypodermella needle blight	Hypodermella laricis Tub.
Indian paint fungus	Echinodontium tinctorium (Ell. & Ev.) Ell. & Ev.
Ink spot of aspen	Cibornia (Sclerotinia) bifrons (Whetz.) Whetz.
Laminated root rot	Phellinus weirii (Murr.) Gilb.
Larch root decay	Resinicium bicolor (Fr.) Parm. (=Odontia bicolor (Fr.) Bres.)
Lodgepole pine needle cast	Lophodermella concolor (Dearn.) Darker

Lodgepole pine needle rust	Coleosporium asterum (Diet.) Syd.
Lophodermium needle cast	Lophodermium seditiosum, Minter, Staley, Miller (=L. pinastri (Schrad. ex Hook,) (Chev.))
Lophodermium tip blight	Lophodermium sp.
Marssonina leaf spot	Marssonina populi (Lib.) Magn.
Meria needle cast	Meria laricis Vuill.
Phoma blight	Phoma eupyrena Sacc.
Pine needle rust	Coleosporium asterum (Diet.) Syd.
Red band needle blight	Scirrhia pini (Funk and A. K. Parker)
Red ring rot	Phellinus pini Pilat. (=Fomes pini (Thore) Lloyd)
Rhabdocline needle cast	Rhabdocline pseudotsugae Syd.
Sirococcus tip blight	Sirococcus strobilinus Preuss.
Spruce broom rust	Chrysomyxa arctostaphyli Diet.
Stalactiform rust canker	Peridermium stalactiforme Arth. & Kern (=Cronartium coleosporioides Arth.)
Swiss needle cast	Phaeocryptopos gaumanni (Rohde) Petr.
Tomentosus root rot	Polyporus tomentosus Fr.
Western gall rust	Endocronartium harknessii (J. P. Moore) Y. Hirat.
White pine blister rust	Cronartium ribicola Fish. ex. Rabh.

DOUGLAS-FIR BEETLE
MOUNTAIN PINE BEETLE
PINE ENGRAVER BEETLE

1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF IDAHO

Scale 1:1,000,000
1 inch equals approximately 16 miles

Datum is mean sea level

Compiled, edited, and published by the Geological Survey 1927 North American datum
Lambert conformal conic projection based on standard parallels 33° and 45°

LEGEND

- State capital
- County seat
- City, town, village, or locality
- Scheduled service airport
- Built-up area shown for towns over 5,000 population

SOURCE DATA

U. S. Dept. of the Interior Geological Survey, topographic maps
U. S. Dept. of the Army Corps of Engineers topographic maps

BASE MAP

POPULATION KEY

BOISE	more than 25,000
TWIN FALLS	10,000 to 25,000
Kellogg	2,500 to 10,000
Shoshone	1,000 to 2,500
Hanley	less than 1,000

Population indicated by size or levels

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR WASHINGTON, D. C. 20242
COMPILED IN 1964
EDITION OF 1968

FIR ENGRAVER BEETLE
WESTERN SPRUCE BUDWORM
PINE BUTTERFLY

1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
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Population indicated by size of letters

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